AN ELECTRONIC DEVICE EQUIPPED WITH A VOICE USER INTERFACE AND A METHOD IN AN ELECTRONIC DEVICE FOR PERFORMING LANGUAGE CONFIGURATIONS OF A USER INTERFACE

5   The present invention relates to an electronic device, which includes

- a voice user interface and a possible terminal user interface for controlling the functions of the device,

10   - speech-recognition devices for implementing the voice user interface, and

- memory, in which language-configurations data is arranged for the user interface, including several language packages, in which language packages several

15   languages are grouped, at least some of which languages may belong to several language packages and of which language packages at least one is arranged to be selected for use in the user interface.

In addition, the invention also relates to a method in an

20   electronic device, for performing language configurations of a user interface, and a computer program meant for to be executed in an electronic device according to the invention.

A great many speaker-independent voice user interfaces (VUI)

25   have recently been developed for various electronic devices. Such user interfaces require language configurations in several languages. Some manufacturers' speaker-independent speech-recognition systems nowadays support up to tens of languages.

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Due to the devices' limited memory properties and the limited processing capacity of speech-recognition systems, all languages cannot be included in a single package totality, but they must be divided into smaller language packages. If too

35   many languages were to be arranged in a single data package,

this would reduce the accuracy of the speech recognition. In addition the 'training' of the acoustic speech models can then be optimized for several language areas, which will achieve advantages, for example, in the recognition of different dia-
5   lects. Each language package can include several languages, the number of which can be, for example, 4 - 10 languages. Language can be arranged into language packages, for example, according to a geographical division into regions. Due to this, the language package to be used must be separately se-
10   lected for the user interfaces of the device, for example, for a voice user interface, which language package is subsequently used, for example, in speech recognition.

The languages that are characteristic of particular geographi-
15   cal regions, for example, can be arranged into separate language packages. In addition to these languages, the language packages can include some widely spread and general used world languages (for example, English, Portuguese, Spanish, German, Russian, Italian), which for some reason may be wished to be
20   included in several language packages. According to this division, each supported language is included in at least one language package while some languages are in several language packages. In this case, and in this application in general, a dialect of a language can also be understood as a language.

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Multi-language systems are, at present, still quite rare, due to which only quite rough means of implementing the selection of a language package are known in the prior art. In these, users must themselves decide and select manually from the de-
30   vice's user interface the language package to be used at each time. However, this has the weakness that this allows the wrong language package to be selected, which can lead to poor performance of the speech recognition. In addition, if the device is not notified at all of the speech language, the opera-
35   tion of the speech recognition will be even poorer.

The language package selection presently carried out by the user is subject to error. One example of this is a situation in which, for example, a Russian user wishes to use, for example, German as the VUI language (i.e. the language by which they wish to control the device by speech) and Russian as the user interface language (i.e. the language that is used, for example, in the graphical user interface GUI of the device). As German is a global language, it is arranged in several language packages and the user will then have several alternatives from which to select a language package, which in itself can lead to undesirable discomfort in the usability of the device.

Users who do not understand the often rather cryptic significance of the language packages and their contents may select the German for use in speech recognition, for example, from the Central Europe language package. This selection will prevent the user from selecting, for example, the Russian they desire as the user interface language, because for reasons of appropriateness it has not been regarded as necessary to include Russian in the Central Europe language package. Such a situation may thoroughly confuse the user and make them incapable of re-selecting a language package. Generally, it is not particularly user-friendly to allow such a situation to arise.

Further, there may be even large regional differences in the pronunciation of world languages that are spoken in several different regions. For example, Slavs pronounce English differently to native English speakers. A similar typical difference also exists between, for example, the German spoken by Swiss/Austrians and that spoken by native Germans. This too may lead to the wrong language package being selected and the subsequent 'faulty' operation of speech recognition and in turn also of the voice user interface.

One state of the art is disclosed in US patent 5,917,484, in
which the language to be used in an electronic device is se-
lected, particularly in the case of a computer. This solution,
however, in no way deals with voice user interfaces or the
speech recognition functionality used in them, in which the
problems described above are considerable. Also, in WO-
publication 2004/019207 A1 (Nokia Corporation) has been de-
scribed the prior art relating to the user interface language
setups particularly for editing of the language sets. Therein
either is not discussed about the language package selection
problems that relate to the voice user interfaces.

The present invention is intended to create a new type of
electronic device with a more highly developed user interface
language arrangement and a method in an electronic device for
performing the language configuration of a user interface. The
characteristic features of the device according to the inven-
tion are stated in the accompanying Claim 1 and of the method
according to the invention in Claim 9. In addition, the inven-
tion also relates to a computer program to be executed in the
device according to the invention, the characteristic features
of which are stated in the accompanying Claim 16.

The invention relates particularly to voice user interfaces
and the selection of a language package to be used in speech
recognition, as well as to the arrangement of language con-
figurations data in an electronic device.

The device and method according to the invention are charac-
terized by the device registering language information for de-
ciding the language-package selection. The language informa-
tion includes information on at least a first language for at
least one user interface. On the basis of this language, the
device can, according to a first embodiment, select the lan-

guage package. In order to perform the selection, information on the languages included in the language packages is arranged in the device.

5   In the invention, the language package that it is desired to use in the user interface is now selected by the operation of the device, for example, on the basis of language information registered from the user. In that case, there can be a data structure arranged in the device, which contains this lan-

10   guage-package information. From the language information provided by the user, the device can, in each selection-alternative situation, select the most suitable language package for use in the device, which is linked to this language information according to a set criterion.

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According to one embodiment, the language package can be selected on the basis of information concerning even a single language. According to a second embodiment, if the language-package selection cannot be performed sufficiently unambigu-

20   ously, information on a second language can be used in addition. In that case, the language package can be selected on the basis of these languages, in the set manner.

According to one embodiment, a native-language package can be

25   defined for each language, which is selected for use as the default value in the case of certain special selection situations. Regardless of the language selection of the user, in this case the best language package about its suitability is always got for the use.

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According to one embodiment, the language information registered in the device can include information, for example, of the language spoken by the user, and which they wish to use in the voice user interface. If, for example, the language in-

35   tended to be used in the device user interface differs from

the user's speech-language selection, the language package cannot necessarily be selected unambiguously. A second example of such a situation may be one in which the language desired for use in the voice user interface is arranged in several
5   language packages, so that the selection of a language package will also not necessarily be unambiguous. In the invention, the problem is solved by the device selecting the language-package automatically, for example, on the basis of language information received from the user.

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With the aid of the invention, the advantage is gained that users need not themselves select an appropriate language pack-age that is difficult to understand, so that the wrong language package may be selected. In the case according to the
15   invention, the language package can be selected unambiguously and automatically, if the user states, in a selected order, the spoken language and the language of the user interface, of which even the second language need not be stated in every situation.

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According to one embodiment, a look-up table of the language-selection combinations can be arranged in the memory of the device, which displays either all, or at least most of the language-selection combinations relating to the selection al-
25   ternatives of the user interface languages, or, on the other hand, only the possible language-selection combinations. A language package that can be selected for use is attached to each combination. In addition, that the best language package becomes selected now, also the selections of the weirdest of
30   all and the illogical of all can even be realized unambiguously without that there would be a need for annoy or confuse the user about his or hers selection.

The other characteristic features of the device and method ac-
35   cording to the invention will become apparent from the accom-

panying Claims and additional advantages gained are itemized in the description portion.

In the following, the electronic device and the related method according to the invention, which are not restricted to the embodiments disclosed in the following, are examined in greater detail with reference to the accompanying drawings, in which

Figure 1   shows a rough block diagram of one example of an electronic device according to the invention,

Figure 2   shows one embodiment of the languages arranged in each language package,

Figure 3a   shows an example of a language list, each language in which is in only one language package,

Figure 3b   shows an example of a language list, each language in which is in several language packages,

Figure 3c   shows an example of a native-language package list for languages in several language packages,

Figure 3d   shows one embodiment of a look-up table for use in selecting a language package, as a partial list,

Figure 3e   shows one embodiment of a look-up table for use in selecting a language package, as a list for determining special cases, and

Figure 4   shows a flow diagram of one embodiment of the method according to the invention in selecting a language package.

Figure 1 shows a rough block diagram of one example of an electronic device 10 according to the invention, which in the

following is described as an embodiment in the case of a mobile station. It should be noted that the category of electronic devices, to which the invention can be applied, must be understood to be extremely wide. Some other examples of devices include portable and hand-held devices in general, such as PDA (Personal Digital Assistant) type devices (e.g., Palm, Vizor), palm computers, smart phones, multimedia devices, camera devices, game consoles, telephones, and dictation machines. In addition, the invention can also be applied in, for example, video/DVD devices, satellite/digibox tuners, televisions, telefax devices, copiers, computers, vending and slot machines, and other similar electronic devices. However, the devices according to the invention mainly have the common feature that they include a Voice User Interface VUI and more particularly such a voice user interface, which is implemented using speech recognition function SR.

The mobile station 10 shown in Figure 1 may be of a type that is, as such known, components of which that are irrelevant in terms of the invention, such as the transmitter/receiver TR, require no further explanation in this connection.

The functions of the device 10 can be controlled using the processor unit DSP/CPU 13, which is used to control, for instance, information displayed on the display component 19 of the device 10, for example, in a graphical user interface GUI. The operation of the processor unit 13 can be controlled using control devices 14, which can be implemented, for example, as a keypad 15, or various switches. The functions of the device 10 can be controlled through a Terminal User Interface TUI, for example, by using a graphical user interface GUI displayed on the display 19 of the device 10 and/or, on the other hand, also by using a voice user interface VUI. The user interfaces VUI/GUI can, besides permitting the control of the device 10,

also provide information on the current state of the device
10.

The mobile station 10 may include, as user interfaces, a voice
5   user interface VUI and a graphical user interface GUI, in gen-
eral one or several user interfaces UI. These can be used in
parallel or even singly to control the functions of the device
10.

10   In order to implement a voice user interface VUI, the device
10 can include speech recognition devices SR and an audio
in/out interface 12, which can include microphone devices MIC
and loudspeaker devices SPKR. Speech recognition SR, which can
be implemented in a manner that is, as such, known, requires
15   language-configuration data LP1 - LP9 in order to function.
The language-configuration data is arranged in the memory de-
vices MEM of the device 10, in a set manner.

Figure 2 shows one schematic example of the language-package
20   division. Several language packages LP1 - LP9 can be formed in
the   memory   MEM   of   the   device   10   from   the   language-
configuration data. One or several, for example 4 - 10, of the
languages L1 - L34 that can be selected for use in the user
interface VUI/GUI are grouped in a selected manner in language
25   packages LP1 - LP9. Each of the available languages L1 - L34
belongs to at least one of the language packages LP1 - LP9.
Table 3a shows an example of a list of the languages that are
only in one language package LP1 - LP9, in the case of the em-
bodiment in question. In addition, at least some of the lan-
30   guages L6, L7, L11, L13, L16, L29 can belong to several, for
example at least two, of the language packages LP1 - LP9. Ta-
ble 3b shows an example list of these languages that belong to
several language packages LP1 - LP9, in the case of the em-
bodiment in question.

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With reference to Figures 2, 3d, and 3e, one criterion for de-
termining the language division of the language packages LP1 -
LP9 are the languages characteristic of each geographical re-
gion, or even of countries, according to which the language

5   packages LP1 - LP9 can also be divided. Some of the languages
L1 - L34 can be in several language packages LP1 - LP9, due,
for example, to their world-wide position. Examples of such
languages in the embodiment are UK_English = L6, German = L7,
Russian = L11, French = L13, Italian = L16, and US_English =

10   L29. At least one of the language packages LP1 - LP9 can be
selected for use in the user interface VUI/GUI of the device
10, particularly in the speech recognition SR implementing the
voice user interface VUI.

15   The language-specific data belonging to the language packages
LP1 - LP9 can, in the case of each language L1 - L34, include,
for example, possible commands in the language L1 - L34 in
question, for controlling the functions of the device 10. On
the other hand, in the case of, for example, the world lan-

20   guages L6, L7, L11, L13, L16, L29, the language data can also
include important information for the speech-recognition en-
gine SR on speech styles/accents of the languages L6, L7, L11,
L13, L16, L29 in question in each geographical region (dia-
lect-specific features), or even commands for the device 10 in

25   the dialect in question. One example of this is the package
Central Europe LP4, in which it is possible to use a language
configuration optimized for Austrian/Swiss German, in place of
native German. Generally, the language data can, however, be
understood to include speech models supporting the languages

30   L1 - L34. In addition, a multi-language system can also in-
clude model data for text-based language recognition.

For example, a registering functionality 17 implemented by
software can be arranged in the device 10 according to the in-

35   vention shown in Figure 1, which can, according to one embodi-

ment, request the user for language information on the desired
language package LP1 - LP9 to be used in the device 10, and
particularly for selecting the user interface language
VUIL/UIL. The language information can include information on
at least one language for at least one user interface. On the
basis of this registered language information, the device 10
can, at its simplest, select the language package to be used.

If the device 10 cannot perform the selection unambiguously on
the basis of the first language information, the device 10 can
be registered, for example, by requesting the user in addition
for a second language for a second user interface. Such situa-
tions requiring two questions may occur, for example, if the
first language L6 selected by the user belongs to several, for
example, at least two language packages LP1 - LP7. On the ba-
sis of these registered first and second language L6, L 11,
the device 10 can perform the selection of the language pack-
age unambiguously, according to language package linked to the
each language-selection alternative and arranged in connection
with the device 10. According to one embodiment, the first
language can be a voice user interface language VUIL i.e. a
speech language and the second language can be a user inter-
face language UIL. The opposite sequence of selection may also
be possible.

The software implementation of the selection functionality 17
can be created, for example, in such a way that the processor
13 of the device 10 is used to perform a group of preset com-
mands in a predefined sequence. The functionality 17 can be
stored in the memory MEM of the device 10, for example, as an
operating-system-level updatable computer program.

Figure 2 shows one embodiment of the language packages LP1 -
LP9 arranged in the memory MEM of the device 10. In it, each
language package LP1 - LP9 has grouped in it the languages L1

- L34 belonging to it. In this case, several language packages
LP1 - LP9, organized by language in a selected manner, are
stored in the memory MEM of the device 10, from which packages
LP1 - LP9 the device 10 can, according to one embodiment,
5   automatically select the most suitable, on the basis of the
language information obtained from the user. In practice, only
one language package LP1 can be in use at any one time, due,
for example, to the limited processing and working-memory WMEM
capacities of the device 10 and the speech recognition SR.

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In addition to the above, if the language L6, which it is
wished to use in the voice user interface VUI and subsequently
also in the speech recognition SR each, belongs to several
language packages LP1 - LP9, being, for example, one of the
15   so-called 'world languages' L6, L7, L11, L13, L16, L29, then
this case would complicate the selection of the language pack-
age LP1 to be used in the device 10, especially if it is made
by the user. In that case, the user may unintentionally select
the voice language VUIL that they wish to use in the voice
20   user interface VUI from a language package with a language
model that does not correspond to the language model that they
speak.

A second example of a problematic situation can be one in
25   which the user selects the voice language VUIL, which they
wish to use in the voice user interface VUI, from one language
package LP2 and the UI-language, which they wish to use in the
graphical user interface GUI, from another language package
LP1. For the reasons referred to above, such a selection could
30   not be implemented in practice, the said situation being dif-
ficult for the device 10 to process, to say nothing of the
confusion that it might cause the user.

Figures 3d and 3e show partly one embodiment for selecting a
35   language package LPx from a look-up table 18 of the language

packages LP1 - LP9 arranged in the memory MEM of the device
10. A suitable language package LPx can be selected for use
from the look-up table 18, on the basis of the language infor-
mation (VUIL, UIL) given to the device 10 by the user. In the
5   look-up table 18 can be operated with the program 17.

Generally, information on the languages L1 - L34 belonging to
each language package LP1 - LP9 is arranged in the look-up ta-
ble 18. Particularly, the look-up table 18 may be grouped in a
10   desired manner, for example, from all, or at least most of the
possible voice-language/UI-language VUIL/UIL combinations (a -
g) and possible (non-unambiguous) special cases (Fig. 3e), and
the language package LP1 - LP9 set to be selected in the case
of each combination (a - g, special_cases). It must be under-
15   stood that Figure 3d does not show the entire look-up table,
but that the table continues from section g, to include at
least all of the possible language-selection combinations.

For each language L1 - L34, it is also possible to set a so-
20   called native-language package, which the device 10 will se-
lect as a default value, if either of the selected user inter-
face languages VUIL/UIL has no meaning, or if it is completely
impossible for the device 10 to select a suitable language
package, in the case of 'weirder' language combinations re-
25   ceived from the user. A native-language package can also be
set to be selected for the languages L6, L7, L11, L13, L16,
L29, which appear in several language packages LP1 - LP9,
which native-language package can be defined, for example,
from the home regions/countries of the languages L6, L7, L11,
30   L13, L16, L29. Table 3c shows an example of a list of the na-
tive default language packages set for these 'world lan-
guages'.

Figure 3e shows an example of part of a look-up table 18,
35   which is applied if both the voice language VUIL and the user

interface language UIL belong to several language packages LP1
- LP9, of which at least some packages are common to both lan-
guages. In order to deal out such a situation, a language
package set to be selected for each pair of languages can be
5   set in a selected manner. The manner of selection for special
cases is not crucial, nor can it even necessarily even be
linked to any particular criterion, instead it can be defined,
for example, according to a decision of the application devel-
oper.

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According to one embodiment, the sequence of the alternative
language-pairs can be made such that the most probable selec-
tion alternatives are at the upper end of Table 18 and the
least probable at the lower end. According to one embodiment,
15   the look-up table 18 can, however, be arranged from all, or at
least most of the language-selection pairs VUIL/UIL, allowing
the most suitable language package to be selected for the user
in each language-selection case.

20   Figure 4 shows one embodiment of the language-package selec-
tion method according to the invention in a device 10. The de-
vice 10 itself, or alternatively the user can activate the
language-package selection procedure 17 (stage 400). Activa-
tion can be spontaneous, for example, the first time that the
25   device 10 is used. The user can express a need to change the
language package, should they for some reason wish to change
the speech language VUIL that they use. In that case, if the
new speech language VUIL can be found from the language pack-
age LP1 that is presently active in the device 10, there will
30   be no need to perform the language-package selection procedure
17. If, on the other hand, the new speech language VUIL is not
found in the present language package LP1, the language-
package-selection functionality must be activated, in order to
select a new language package LPx (x = 1 - 9) and a new lan-

guage Lx (x = 1 - 34) from it, for example, at least for
speech recognition.

In the embodiment described, once the selection procedure 17
5   has been initiated, the device 10 shows, for example, on its
display component 19, a list of all the language alternatives
L1 - L34 that can be selected (stage 401). The selection pro-
cedure can start from the selection of a language Lx for ei-
ther the voice user interface VUI (VUIL), or, on the other
10 hand, also for the user interface GUI (UIL). Stated generally,
the device 10 can register, for example, by requesting the
user for a first language L1/L6 for at least one user inter-
face VUI, UI.

15 In this embodiment, the user provides the device 10 with in-
formation on the desired first language, i.e. now the voice
user interface language, i.e. the speech language VUIL. The
device 10 registers the user's language selection (stage 402)
and the software functionality 17 investigates whether the
20 VUI-language VUIL selected by the user can be found in more
than one language package LP1 - LP9 (stage 403). The language
packages LP1 - LP9 can be arranged in the memory MEM of the
device in the form of files, each of which has its own ID
identifier. The language packages can also contain information
25 on the regions/countries that the package LP1 - LP9 has been
set to signify. The device 10 performs the search operation
from the look-up table 18 arranged in its memory MEM, or from
tables according to Figures 3a, 3b. In order to perform the
search operation, language-language package information con-
30 taining data on the one or several language packages LP1 -
LP9, to which each language L1 - L34 is arranged to belong, is
arranged in the manner described above in the device 10.

If the VUIL-language selected or entered by the user cannot be
35 found from more than one language package, the language selec-

tion made by the user is unambiguous. Such a situation can arise, if the language is a so-called less-spoken language. On this basis, the device 10 selects the language package LP1 corresponding to the VUI-language VUIL selected by the user

5   and loads it into the working memory WMEM of the device 10 and activates it to be used in speech recognition SR (stages 404.1 and 405.1). At the same time, the language package LP1 in question can be set in the permanent configurations of the device 10, in which case the selection of the language package

10 LP1 need not always be performed again whenever the device 10 is subsequently started. The speech-recognition functionality SR loads the information on the language package LP1, which it is desired to use, and more particularly on the language L1, every time the device is switched on and when the voice user

15 interface VUI is activated.

If, on the other hand, the look-up table/list analysis performed by the device 10 in stage 403 shows that the VUI-language VUIL stated by the user can be found in several lan-

20 guage packages LP1 - LP9, the selection of the language package LP1 - LP9 is no longer unambiguous. Such a situation arises in the case of widely-spoken languages L6, L7, L11, L13, L16, L29, which are arranged in several language packages, as previously described. Some, though in no way restric-

25 tive examples of these languages are, in addition to the languages L6, L7, L11, L13, L16, L29 referred to above, also Spanish and Portuguese with their various dialects. The device 10 now requires UI-language information, in order to decide the selection of the language package.

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In this case, stage 403 can be followed with a second list of second language alternatives to be shown to the user, for the second user interface GUI (stage 404.2). This second list can be, for example, limited, but also complete. In the limited

35 list, only the second-language alternatives may be shown,

which appear in the same language package LP1 together with
the first selected language L6. If the list is shown in a com-
plete form, then in the case of a non-co-operative user, in
which case inappropriate language selections are also possi-
ble, the native-language-package information (Figure 3c) and
the special-situation partitions of the look-up table 18 (Fig-
ure 3e) are applied.

The device 10 registers the language selection L1 performed
from the list by the user (stage 405.2). Next, the device 10
selects the language package LP1 to be used in the device 10
and particularly in the speech recognition SR of the voice
user interface VUI, from the look-up table 18 (Figure 3) ar-
ranged in its memory MEM, on the basis of the first and sec-
ond, i.e. now VUI and UI-language selection L6, L1 made by the
user.

If the selected languages VUIL and UIL do not have a single
common language package, the selection can be performed ac-
cording to the native-language package linked to the selected
voice language VUIL. If the second, in this case the latter of
the language selections L1 made by the user appears in only
one language package LP1, the selection of the language pack-
age to be used is unambiguous. The device 10 then selects for
use the language package LP1, in which this second language L1
appears. If the VUIL language and the UIL language are the
same and appear in only one common language package, the lan-
guage package is selected according to the native-language-
package link. However, if both language selections L6, L7 ap-
pear in several, i.e. now in at least two of the same language
packages LP1 - LP9, the device 10 then selects the language
package LP1 according to the special situations (Figure 3e)
defined in the look-up table 18. In that case, the language
package LP3 (Northern Europe) should be selected, according to
the look-up table 18. Further, if all languages are presented

in stage 404.2 without elimination being performed according to the first language VUIL, and the second language UIL does not have a single language package in common with the first language VUIL, the language package is selected according to the speech language VUIL. Thus, also in such a situation the most appropriate language package, according to the language selection, is provided.

From stage 406.2, the procedure moves to the activation of the VUI-language (stage 405.1), and it is possible to act in the manner described above.

Both stages 405.1 and 406.2 can be followed by the possible activation of the UI-language, which is performed on the basis of the language-package-selection stages described above (stage 407.2), after which the selection procedure can be terminated (stage 500).

The above describes the selection of a language package LP1 - LP9 in a situation, in which the voice language VUIL is first registered, followed by the user interface language UIL. The opposite registration sequence is also possible. In that case, when the UI-language UIL is found in stage 403 from only one language package, stage 404.1 is performed, and after that a sub-stage, which is not described, for selecting the VUIL language from the unambiguous language package defined by the UI-language UIL.

Correspondingly, if the UI-language is found in stage 403 from several language packages, stages 404.2 - 406.2 are performed in a corresponding sequence to select the VUI-language VUIL. Thus the variation of the question sequence of the languages UIL, VUIL has practically no effect in increasing the complexity of the selection procedure.

Basing the selection on the user interface-language informa-
tion provided by the user also achieves the advantage that not
only is the most suitable language package LP1 used, but also
additional certainty is given to the operation of the speech
recognition SR. This is because account is taken of the typi-
cal dialect of the language appearing in the geographical, or
even national region in question. When striving to achieve the
most natural operation for the user interface, the interaction
between the user and the device 10, for example, in the case
of performing different configurations selections, is hoped to
be minimized, which property is also achieved by use of the
invention.

Above, the invention is described as an individual embodiment.
It should be noted that one versed in the art can vary the
software procedure described above and perhaps perform it in a
manner differing from the arrangement described above. In ad-
dition, it is also possible to add various additional stages,
for example, help functions and error-state processing.

It must be understood that the above description and the re-
lated figures are only intended to illustrate the present in-
vention. The invention is thus in no way restricted to only
the embodiments disclosed or stated in the Claims, but many
different variations and adaptations of the invention, which
are possible within the scope on the inventive idea defined in
the accompanying Claims, will be obvious to one versed in the
art.